

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Hermann Kopetz and Georg Kopetz
SERIAL No.: Unassigned EXAMINER: Unassigned
FILED: Herewith GROUP No.: Unassigned
TITLE: METHOD FOR ENFORCING THE FAIL-SILENT PROPERTY
IN A DISTRIBUTED COMPUTER SYSTEM AND
DISTRIBUTOR UNIT OF SUCH A SYSTEM

Attorney Docket No.: 3026.002USU

Commissioner for Patents
Washington, D.C. 20231

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2/8/02
(Date of Deposit).

Alex Nulman
Name

Alex Nulman
Signature

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the application as follows:

In The Specification

Please amend the specification as follows:

On page 1, at line 4, insert -- Background of the Invention--

-- 1. Field of the Invention --.

On page 1, between lines 17 and 18, insert --2. Background of the Invention --.

On page 3, between lines 13 and 14, insert --Summary of the Invention--.

On page 5, between pages 11 and 12, insert --Brief Description of the Drawings--.

Please replace the paragraph on page 5, lines 12-14 with the following:

The invention along with its other advantages is explained more closely hereafter by means of embodiment examples, which are illustrated in the accompanying drawings, wherein:

On page 6, between lines 4 and 5, insert -- Detailed Description of the Invention--.

Please replace the paragraph on page 6, lines 5-8 with the following:

An embodiment of the invention will now be presented by an example with four remote computers, which are connected via two replicated distributor units. The objects in the drawings are numbered such that the first of the three-place reference numbers always pertains to the number of the drawing.

In The Abstract

Please amend the abstract as follows:

ABSTRACT OF THE DISCLOSURE

A method for ensuring the fail-silent property in the time domain of remote communication computers of a fault-tolerant distributed computer system, in which a plurality of remote computers are connected via a distributor unit, each remote computer has an independent communications controller unit with the corresponding connections to the communication channels, and the access to the communication channels occurs by a cyclical time-division multiple access method. The at least one distributor unit makes sure, by virtue of the correct sending behavior of the remote computer that is known a priori by it, that a remote

computer can only send to the other remote computers within its statically assigned time slice.

In The Claims

Please amend the claims as follows:

1. (Amended) A method for enforcing the fail-silent property in the time domain of remote communication computers of a fault-tolerant distributed computer system, in which a plurality of remote computers are connected via a distributor unit, each remote computer has an independent communications control unit with the corresponding connections to the communication channels, and the access to the communication channels occurs by a cyclical time-division multiple access method,

wherein

the at least one distributor unit makes sure, by virtue of the correct transmission behavior of one of said plurality of remote computers that is known a priori by it, that said known remote computer can only send successfully to others of said plurality of remote computers within its statically assigned time slice.

2. (Amended) The method according to claim 1, wherein the at least one distributor unit switches from an "unsynchronized" state, in which receiving is possible via all input ports, after receiving a correct message, to a "synchronized" state, in which receiving is only possible via one input port during the time slice statically assigned to this input port.

3. (Amended) The method according to claim 2, wherein the at least one distributor unit switches from a "synchronized" state to an "unsynchronized" state when no correct message has been received since a last initialization message at any of its input ports within an a priori specified time interval.

4. (Amended) The method according to claim 1, wherein, in said at least one

distributor unit, the content of arriving messages is evaluated as an additional fault recognition.

5. (Amended) The method according to claim 1, wherein the at least one distributor unit assumes an "unsynchronized" state after "power-up".

6. (Amended) The method according to claim 1, wherein the at least one distributor unit converts arriving physical signals into digital form, using a local clock of the distributor unit, and converts said digital form signals back into the physical form before sending them.

7. (Amended) The method according to claim 1, wherein said at least one distributor unit comprises a plurality of distributor units that are connected to each other via communication channels in order to enable a power-up and clock synchronization of one of said plurality of distributor units, even when no messages arrive at connections of said one of said plurality of distributor units.

8. (Amended) The method according to claim 1, wherein said at least one distributor unit is connected via dedicated communication channels to at least one maintenance computer, which performs a parameterization of the at least one distributor unit and monitors the correct functioning of the at least one distributor unit during operation.

9. (Amended) At least one distributor unit of a fault-tolerant distributed computer system, by which a plurality of remote computers are connected to each other, each remote computer having an independent communications control unit with corresponding connections to communication channels, wherein access to the communication channels occurs by a cyclical time-division multiple access method,

and further wherein

the at least one distributor unit ensures, by virtue of the proper transmission

behavior of at least one of said plurality of remote computers that is known a priori by it, that said at least one remote computer can only send successfully to others of said plurality of remote computers within said at least one remote computer's statically assigned time slice.

10. (Amended) The at least one distributor unit according to claim 9, for executing a method for enforcing the fail-silent property in the time domain said plurality of remote computers, said method comprising:

ensuring, by virtue of the correct transmission behavior of one of said plurality of remote computers, that said one of said plurality of remote computers can only send successfully to others of said plurality of remote computers within said one of said plurality of remote computers statically assigned time slice; and

switching from an "unsynchronized" state, in which receiving is possible via all input ports, after receiving a correct message, to an "synchronized" state, in which receiving is only possible via one input port during the time slice statically assigned to this input port.

Remarks

Claims 1-10 remain in the application.

The specification has been amended to include headings consistent with U.S. practice.

The Abstract of the Disclosure has been amended to eliminate reference numbers and to comply with MPEP 608.01(b).

Claims 1-10 have been amended to eliminate reference numbers, to eliminate the phrase "characterized in that," and to provide proper antecedent basis for the claimed elements.

As such, claims 1-10 have been clarified by amendment for purposes of form. It is respectfully submitted that the amendments to claims 1-10 are neither narrowing nor made for substantial reasons related to patentability as defined by the Court of Appeals for the Federal Circuit (CAFC) in Festo Corporation v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 95-1066 (Fed. Cir. 2000). Therefore, the amendments to claims 1-10 do not create prosecution history estoppel and, as such, the doctrine of equivalents is available for all of the elements of claims 1-10. Accordingly, it is respectfully submitted that claims 1-10, as amended, are allowable.

Consideration and allowance of the application is respectfully requested.

Attached hereto is a marked up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made."

2-8-02
Date

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Specification

Please amend the specification as follows:

On page 1, at line 4, insert -- Background of the Invention--
-- 1. Field of the Invention --.

On page 1, between lines 17 and 18, insert --2. Background of the Invention --.

On page 3, between lines 13 and 14, insert --Summary of the Invention--.

On page 5, between pages 11 and 12, insert --Brief Description of the Drawings--.

Please replace the paragraph on page 5, lines 12-14 with the following:

The invention along with its other advantages is explained more closely hereafter by means of embodiment examples, which are illustrated in the [drawing. This shows] accompanying drawings, wherein:

On page 6, between lines 4 and 5, insert -- Detailed Description of the Invention--.

Please replace the paragraph on page 6, lines 5-8 with the following:

[In the next section, we shall present an] An embodiment of the invention will now be presented by an example with four remote computers, which are connected via two replicated distributor units. The objects in the drawings are numbered such that the first of the three-place reference numbers always pertains to the number of the drawing.

In The Abstract

Please amend the abstract as follows:

[SUMMARY] ABSTRACT OF THE DISCLOSURE

[Method] a method for ensuring the fail-silent property in the time domain of remote communication computers [(111, ... 114)] of a fault-tolerant distributed computer system, in which a plurality of remote computers are connected via a distributor unit [(101, 102)], each remote computer has an independent communications controller unit with the corresponding connections to the communication channels [(121)], and the access to the communication channels occurs by a cyclical time-division multiple access method. The at least one distributor unit makes sure, by virtue of the correct sending behavior of the remote computer that is known a priori by it, that a remote computer can only send to the other remote computers within its statically assigned time slice.

[Figure 1]

In The Claims

Please amend the claims as follows:

1. (Amended) A method for enforcing the fail-silent property in the time domain of remote communication computers [(111, ..., 114)] of a fault-tolerant distributed computer system, in which a plurality of remote computers are connected via a distributor unit [(101, 102)], each remote computer has an independent communications control unit [(210)] with the corresponding connections to the communication channels, and the access to the communication channels occurs by a cyclical time-division multiple access method.

[characterized in that] wherein

the at least one distributor unit [(101, 102)] makes sure, by virtue of the correct transmission behavior of [the] one of said plurality of remote [computer (111, ..., 114)] computers that is known a priori by it, that [a] said known remote

computer can only send successfully to [the other] others of said plurality of remote computers within its statically assigned time slice.

2. (Amended) The method according to claim 1, [further characterized in that] wherein the at least one distributor unit [(101, 102)] switches from [the] an "unsynchronized" state, in which receiving is possible via all input ports [(311)], after receiving a correct message, to [the] a "synchronized" state, in which receiving is only possible via one input port during the time slice statically assigned to this input port.

3. (Amended) The method according to claim [1 or] 2, [further characterized in that] wherein the at least one distributor unit [(101, 102)] switches from [the] a "synchronized" state to [the] an "unsynchronized" state when no correct message has been received since [the] a last initialization message at any of its input ports [(311)] within an a priori specified time interval.

4. (Amended) The method according to [one or more of claims 1 to 3, further characterized in that in a] claim 1, wherein in said at least one distributor unit [(101, 102)] the content of arriving messages is evaluated as an additional fault recognition.

5. (Amended) The method according to [one or more of claims 1 to 5, further characterized in that] claim 1, wherein the at least one distributor unit [(101, 102)] assumes [the] an "unsynchronized" state after "power-up".

6. (Amended) The method according to [one or more of claims 1 to 6, further characterized in that] claim 1, wherein the at least one distributor unit [(101, 102)] converts [the] arriving physical signals into digital form, using [the] a local clock of the distributor unit, and converts [them] said digital form signals back into the physical form before sending them.

7. (Amended) The method according to [one or more of claims 1 to 6, further characterized in that] claim 1, wherein said at least one distributor [units (101,

102)) unit comprises a plurality of distributor units that are connected to each other via communication channels [(201, 202)] in order to enable [the] a power-up and clock synchronization of [a] an individual one of said plurality of distributor [unit] units, even when no messages arrive at [its own] connections of said individual one of said plurality of distributor units.

8. (Amended) The method according to [one or more of claims 1 to 6, further characterized in that] claim 1, wherein said at least one distributor [units are] unit is connected via dedicated communication channels [(141, 142)] to at least one maintenance computer, which performs [the] a parameterization of the at least one distributor [units] unit and monitors the correct functioning of the at least one distributor [units] unit during operation.

9. (Amended) [A] At least one distributor unit [(101, 102)] of a fault-tolerant distributed computer system, by which a plurality of remote computers [(111, ..., 114)] are connected to each other, each remote computer [has] having an independent communications control unit [(211)] with corresponding connections to [the] communication channels [(201, 202), and] wherein access to the communication channels occurs by a cyclical time-division multiple access method,

[further characterized in that] and further wherein

the at least one distributor unit [(101, 102)] is designed to make sure] ensures, by virtue of the proper transmission behavior of [the] at least one of said plurality of remote [computer] computers that is known a priori by it, that [a] said at least one remote computer can only send successfully to [the other] others of said plurality of remote computers within [its] said at least one remote computer's statically assigned time slice.

10. (Amended) The at least one distributor unit [(101, 102)] according to claim 9, [designed to carry out the] for executing a method [according to one of claims 2

to 8] for enforcing the fail-silent property in the time domain said plurality of remote computers, said method comprising:

_____ ensuring, by virtue of the correct transmission behavior of one of said plurality of remote computers, that said one of said plurality of remote computers can only send successfully to others of said plurality of remote computers within said one of said plurality of remote computers statically assigned time slice; and

switching from an "unsynchronized" state, in which receiving is possible via all input ports, after receiving a correct message, to an "synchronized" state, in which receiving is only possible via one input port during the time slice statically assigned to this input port.